Overview

The Burlington Hill site is a residential development built in close proximity to the former Asbestos-Talc Products of Washington, Inc. EPA conducted opportunistic reconnaissance sampling at four locations to determine if asbestos was present. At one of the locations sampled, asbestos was identified.

Introduction

This report presents the results of a field reconnaissance visit conducted by EPA Region 10's Office of Environmental Cleanup in coordination with the Office of Environmental Assessment. The purpose of the study was to determine if asbestos was present at a site where a former quarry now abuts a residential development.

The study described in this report is intended to provide initial characterization results to determine whether asbestos is present at the site. This initial phase was focused on locations that were easily accessed by EPA staff and does not constitute a systematic sampling of the entire subdivision. This work was conducted in the fall of 2012.

Background and Site Location

A resident who lives on Burlington Hill, in Burlington, Skagit County, Washington called EPA during the summer of 2012 to ask about the potential presence of asbestos in the subdivision where he lives. He provided documentation in support of his claim; in particular, he referenced a USGS Report (Van Gosen 2010) which identified Burlington Hill as the site of the former Asbestos-Talc Products of Washington, Inc. Van Gosen's (2010) report states:

> Although it was not specifically described as an asbestos producer, noteworthy is a quarry that operated sometime in the 1930's on Burlington Hill, overlooking the town of Burlington in Skagit County. According to Glover (1956, p. 14), "Asbestos-Talc Products of Washington, Inc., of Burlington, Skagit County, mines a somewhat fibrous soapstone-actinolite mixture that has developed in shear zones cutting greenstone. It is ground, mixed with asbestos and use [sic] for special cements."

The site is located on Burlington Hill, in Burlington, Skagit County, Washington. EPA's Andy Smith, Julie Wroble, and Lorraine Edmond visited the site on September 26, 2012, to meet with the resident, conduct a site reconnaissance, take photographs and collect samples for asbestos analysis.

Methods

In response to the resident's concern, EPA mobilized for the site visit and focused on areas that could be easily accessed. Figure 1 shows locations where field observations were made by Lorraine Edmond and samples were collected by Julie Wroble. These locations consisted of two roadcuts, the resident's property, and the former quarry. Sample locations were determined based on ease of access and the presence of exposed rock (outcrops and road cuts). Samples were collected by breaking off fragments of exposed rock with a rock hammer, and placing the fragments into a sample jar for analysis by polarized light microscopy (PLM). For more in-depth results, larger samples of rock specimens were gathered that could be photographed using a

stereomicroscope at EPA's Manchester Environmental Laboratory (MEL). The samples for PLM analysis required additional crushing at the laboratory to reduce the material to the appropriate size.

A total of 15 samples were collected. Nine of these were sent to a commercial laboratory for fast-turnaround, routine PLM analysis. PLM analysis with dispersion staining is a light microscope technique that identifies asbestos in bulk materials, such as soil. The remaining 6 samples were sent to MEL for confirmation sampling and a more complete analytical workup. Additional analyses by scanning electron microscopy (SEM), Energy Dispersive Spectroscopy (EDS) and x-ray diffraction (XRD) were performed by MEL to confirm the presence of asbestos and to provide images of any asbestos found.

Results

Field Observations

Field observations for each location are provided below. A summary of sample information is provided in Table 1.

Location 1 (48° 29.223574/122° 19.507260)

Starting at the northwest entry to the Burlington Hill development, the first samples were collected from a road cut on Hillcrest Drive, just as the road begins to climb uphill. We moved from downhill to uphill along the road cut and sampled three separate sample sites (see Table 1), but these are considered one sample location.

The rock throughout the road cut is a highly fractured green schist. Some zones are lighter than others and have a talc consistency.

The image above is from the farthest downhill sample for MEL (12090101). Some minor quartz veins are apparent in the hand sample, but nothing obviously fibrous. Material is weathered, fine-grained, light green, and has a talc or soapstone consistency. The texture of the rock is slaty and with no apparent fibers, but there are some small needle-shaped crystals.

The mid-hill sample from same road cut (i.e., second sample for MEL, 12090103) is slightly up the hill from the previous sample. The rock has a green and very platy texture overall. This sample is also not obviously fibrous, but some fragments are very needle-like. The finer, more weathered material was sampled for PLM analysis (12090104).

The image above is the platy rock collected as MEL 12090103.

The most uphill sample from the same road cut is for PLM (12090105). This is from some more weathered material, pale green, with a shaly texture and fractures that contain what seems to be a fibrous material, with needle-like structure. This sample was from the uphill edge of the outcrop, just below the cement block retaining wall.

Location 2 (48° 29.130644/122° 19.424313)
These samples are from a residence on Tinas Coma Drive. The first is from an outcrop to the left of the upper garage door (south of driveway). The rocks here are striated, weathered, and have a sort of "woody" texture from a distance (sample 12090106).

In the hand sample, the texture is very platy and contains needle-like crystals.

The PLM sample collected has some organic matter (12090107). This sample does not show obvious fibers, but has a needle-like texture locally, although most of the rock is platy.

The next sample was collected adjacent to the garage, on the left side (west) of the driveway. The light green material was observed and one surface looks very fibrous.

The sample (12090108) collected was farther along driveway, at the garage corner. A fractured surface shows the fibrous material visible with a hand lens.

The PLM sample collected at 12:02 PM is along a hillslope outcrop adjacent to the family room window of the residence (12090109). This is a darker rock with a slaty texture; some of the thin veinlets on surfaces look fibrous.

Location 3 (48° 29.116345/122° 19.260343)
This location is reportedly the old quarry site, and contains remnants from some site preparation for planned condos that were never built. The rock along the back wall is dark gray, almost black, has a slaty texture, but is competent enough to hold a nearly vertical slope.

The right end of the wall (north) is our first sample location (12090110). There is no obvious veining or fibers or even needles, and not even much of the gray-green altered rock at this location, although both the north and south ends have a little more weathering or alteration. There is no evidence of the talc that was reportedly mined here. A few quartz veinlets are present. The hand sample is dark gray, very foliated, with no visible fibers.

A sample for PLM analysis (above, 12090111) was collected from a more weathered zone at the north end of the quarry wall.

A PLM sample (12090112) was collected from south end of the quarry. This black-gray, shaly rock, sample of fine soil was from one of the few weathered zones in this area. Nothing resembling talc was observed.

Location 4 (48° 28.927230/122° 19.244484)
The final location was the road cut at the neighborhood entry on southeast side of Burlington Hill.

Here the rocks look similar to those seen at Location 3. The light gray-green color and the talc consistency layers observed at Location 1 were not observed here. The rock is more competent and also contains some of the quartz veinlets. At the end of cut (uphill), some of the altered greenish rock with needle-like structures along fractures was observed and sampled (12090113, see below). The rock is dark gray and shaley, and not visibly fibrous, but the thin green fractured surface could be different. No fibers were visible with hand lens, however.

Another sample (12090114) was collected from north (uphill) end of the road cut. A final sample was collected at south end of cut (12090115). Nothing fibrous was observed in the hand sample.

Analytical Results

Table 2 summarizes the PLM results from the commercial laboratory (see Appendix A) and Table 3 presents a summary of PLM results from MEL (see Appendices B and C). Note that asbestos was identified only at Location 1. The type of asbestos identified was actinolite asbestos, which is consistent with what was reported by USGS (Van Gosen 2010). No other types of asbestos were identified in the samples collected at the site. MEL reported much higher concentrations (i.e., 15-20%) compared to what the commercial laboratory reported (i.e., 0.5 – 0.75%). This is likely because the MEL analyst received whole specimens and likely picked through these looking for suspect asbestos when making his preparations, whereas the commercial laboratory milled the sample as received and processed it without any bias. The difference also could be due to the preparation technique employed by each laboratory. The commercial laboratory used a Spex freezer mill to reduce particle size while MEL did light grinding with a mortar and pestle.

MEL also performed SEM/Energy Dispersive Spectroscopy (EDS) and XRD analysis on select samples. PLM images from all 6 samples analyzed by MEL are included in Appendix B. SEM images from samples 12090101 (12394051) and 12090103 (12394053) are also included in Appendix B. EDS confirmed the presence of actinolite in samples 12090101 and 12090103.

XRD results indicate the presence of chlorite, mica, quartz, and feldspar present in samples that do not contain actinolite (see Appendix C).

Conclusions

EPA conducted a site reconnaissance and limited sampling at the Burlington Hill site in September 2012. Actinolite asbestos was identified at one of four locations sampled during this focused field visit. This location is along a roadcut on the northeast side of Burlington Hill. Asbestos was not found at other sampled locations, including one residence in the subdivision.

Uncertainties

Because this was a very limited investigation, the results have associated uncertainty. We can be confident that asbestos is present at one location on Burlington Hill. Asbestos was not found in the other three locations. A more comprehensive site investigation would be needed to characterize a larger portion of Burlington Hill with respect to the nature and extent of potential occurrences of asbestos.

Risks associated with potential exposures to actinolite asbestos at Burlington Hill cannot be quantified given the type of data collected. For risk characterization, air samples that measure asbestos concentrations that people could breathe in would be needed. EPA often conducts activity-based sampling (ABS) to characterize asbestos exposures and associated risks. Given the available data, EPA would caution people to refrain from disturbing material in the vicinity of location 1.

Discussion

The information gathered during the September 2012 site reconnaissance and focused sampling event confirm the presence of actinolite asbestos at one location on Burlington Hill. However, the results do not give us a sense of the nature and extent of natural occurrences of asbestos nor do they support the assessment of potential exposures and risks to residents, workers, or visitors to the subdivision.

Asbestos is a known, human carcinogen (EPA 1993) and also causes serious non-cancer disease in people who are exposed. As a result, people should limit their exposures to asbestos that occurs naturally at the Burlington Hill site.

References

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